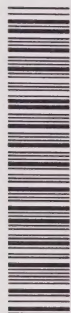
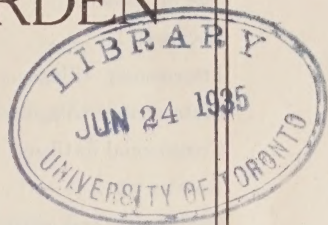


THE VEGETABLE GARDEN

By

W. S. BLAIR, Superintendent

DOMINION EXPERIMENTAL STATION, KENTVILLE, N.S.



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Onions grown from seed started under glass and transplanted.

DOMINION EXPERIMENTAL FARMS

E. S. ARCHIBALD, B.A., B.S.A., LL.D., D.Sc., Director

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

PAMPHLET NO. 166—NEW SERIES

Published by direction of the Hon. Robt. Weir, Minister of Agriculture
Ottawa, Canada, 1935

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THE VEGETABLE GARDEN

BY

W. S. BLAIR, *Superintendent*

Dominion Experimental Station, Kentville, N.S.

In presenting this information it is hoped that the interest it may arouse will result in the increased growing of vegetables on the farm. There are many essential details to which close attention must be given if success in vegetable growing is to be achieved, but the management of the details is not beyond anyone who can form reasonable judgments in his undertakings.

The value of vegetables in reducing costs in the home is not fully realized, and because of this there are few particularly good vegetable gardens. A crop value of \$30 for one-quarter of an acre in different vegetables is certainly not excessive. There are 50,000 farm and garden holdings in Nova Scotia with land capable of producing crops worth this amount for their household use alone, and this is the equivalent of one and one-half million dollars.

Size of Garden

To arrive at the area that may be required for a vegetable garden consideration must be given to the staple vegetable crop, potatoes; if this crop is grown in the field area a smaller garden area will, of course, be required. It would seem, however, that a few rows of a good, early-maturing variety of potatoes should be planted early to make the vegetable garden complete. Areas varying between one-quarter of an acre (roughly 110 feet by 110 feet) and one-half an acre will suit most households.

Location

There are various reasons, apparent to any one, why the vegetable garden should be located near the house and in a sunny situation.

The poultry should be confined to an enclosed range, but if they are not, the fencing of the garden is a necessity. It is not possible to have a satisfactory garden with hens ranging through it.

The condition of the soil may make it necessary to provide for the proper drainage of surface water. This may be done by constructing ditches one foot deep along the outer edge of the grass boundary, with an outlet at the lowest part and provision made to drain surface water from the garden to these ditches, across the grass belt. This is necessary if the soil is heavy and without natural drainage. This detail attended to will give an area suitable for garden purposes. On light well-drained soils this is unnecessary.

Preparatory Tillage

This is one of the important operations, and the one most often neglected. The ground may be manured and ploughed in the fall or spring, but the fall is advised as the better time. Manure should be applied at the rate of twenty tons per acre, and the ground ploughed to a depth of six or eight inches. Disking and levelling in the spring when the soil is dry enough to work are then all that is required.

If the ploughing is left until spring it should not be done when the land is wet, or when after a few hours of drying out it cannot be disked into a crumbly mass. If it should be allowed to dry too much the best thing is to leave it until a brisk rain, when the dry furrows will work into a fine seed-bed. With sandy loams this trouble is not experienced, as the sand makes possible a fine seed-bed no matter how handled. After ploughing do not allow land to remain unworked until it becomes baked, as tillage to correct this is difficult.

Maintenance Tillage

All cultivation after crops are seeded should be shallow. The roots of plants should not be disturbed by the cultivator. The essential thing is to prevent the growth of weeds and leave a shallow surface covering of fine soil. Frequent cultivation is necessary, and also frequent hoeing. If done every week the cost or labour is not great, but if it is not done when it should be it may become irksome.

Commercial Fertilizer

The practice of applying 200 to 300 pounds of a high-grade complete fertilizer to the quarter-acre garden should supply the quickly available nitrogen, phosphoric acid, and potash required by any garden crop. This fertilizer is scattered broadcast after disking, and worked into the soil before planting.

Rowing Up

On heavy or damp soils rowing up is advised; on light soils this is not necessary. The rows are spaced 30 inches apart to permit of horse cultivation. If the rows are run up high they should be raked off so that the centre of the row is four inches above the lowest point between the rows.

Cool- and Warm-Season Vegetables

Vegetables may be divided into two groups: those which may be planted at any time as soon as the ground can be worked, and those which will not grow until the soil has warmed up sufficiently. Beans, tomatoes, corn, cucumbers, squash, pumpkins, and others of this kind cannot be set or the seed planted until toward the last of May. Frost will injure the warm-season vegetables and not affect the others.

Good Seed

The aim of every gardener should be to get good seed. Well selected seed often comes fairly high, but the only reason it does is that much care and attention must be given to its development. It seems advisable to get the best seed possible even though the price may seem to be high. The experience of most growers would indicate that when good judgment is used in starting the plants, the high-priced, selected seed is the cheapest, because more plants and a better quality of product are possible.

Flats

The most convenient flat or shallow box in which to start plants is one 12½ by 22 inches, and 3 inches deep. The end pieces are of ¾-inch wood 12 inches long and 3 inches deep. The two sides and four bottom pieces are ¼-inch wood 22 inches long and 3 inches wide. In putting on the bottom the two outside pieces are nailed flush with the sides, and the inner pieces are spaced evenly to allow for drainage.

If properly cared for, and dried out and stored after use, they will last for several years. A uniform size in the flats permits of a more economical use of space in the hotbed or coldframe.

Lime

Lime is essential for the securing of good crops on most vegetable garden areas. Two tons of ground limestone per acre is sometimes sufficient for the first application, but usually four tons per acre is necessary. This is equivalent to from 1 to 2 pounds per square yard, and these rates should be ample and not excessive. After the first application one-half pound per square yard is all that should be applied each year, and after a few years this may be in excess of the requirements.

Lime is valuable because it improves the texture of certain heavy soils. Its greatest value is in the reduction of soil acidity and in supplying the necessary calcium. Highly acid soils are not satisfactory for vegetable crops.

The term "pH value" is used to indicate acid, neutral, or alkaline soils. The range in pH value of soils is not great. A pH value of 5 is considered too acid for the most satisfactory vegetable growth. A soil ranging from 6 to just under 7 is moderately acid and produces good growth. It would seem that a pH value of from 6 to 6.5 is the most satisfactory.

Vegetable crops vary in their requirements in this particular, and farm-yard manures have an influence on the soil reaction which may lessen the need for as much lime as advised. It is evident that excessive liming may be a disadvantage but without a moderate application to meet the requirements of many vegetables satisfactory crops cannot be grown. It is evident that the efficiency of any commercial fertilizer or manure is increased if the soil is not too acid. A soil that will grow a good crop of clover should be satisfactory for practically all vegetable crops.



The field area of two acres where vegetable garden tests have been carried on at Kentville since 1913.

Plan of the Vegetable Garden

It is advisable not to grow certain crops on the same area year after year. It is found that by growing these crops one year on one-half of the garden and on the other half the following year the vegetable garden can be continued on the same area for a number of years. The vine crops should be in the centre of

the garden as they can be grown from year to year on the same ground, and the crops on each side of them on the plan can be alternated from year to year. The asparagus and rhubarb are, of course, permanent plantings. No rows should be closer than $2\frac{1}{2}$ feet, which permits of horse cultivation between them. The adoption of such a plan will be satisfactory. It is noticeable that in many plans a garden longer than it is wide is advocated, but this does not lend itself so well to rotation, and by the method proposed a rotation of four years for most of the crops is easily possible.

Plan of Planting

Row	Vegetable	Seed for 100 feet of row	Depth to plant seed	Distance apart of plants in row
1	Asparagus	oz.	in. (Depth to set plants 6 in.)	in.
2	Asparagus			18
3	Rhubarb		2	60
4	Early potatoes		3	12
5	Early potatoes		3	12
6	Peas	24	3	1
7	Peas	24	3	1
8	Peas	24	3	1
9	Beans	16	4	2
10	Beans	16	4	2
11	Garden turnip	1	5	6
12	Cabbage	(1 pkt.)	5	30
13	Cabbage	(1 pkt.)	5	30
14	Cauliflower and cabbage	(1 pkt.)	5	30
15	Tomato	(1 pkt.)	(plants)	48
16	Cucumber, squash and pumpkin	(1 pkt. each)	2	6
17	Parsnip	2	4	4
18	Carrots	1	4	3
19	Carrots	1	4	3
20	Beets	2	5	4
21	Beets	2	5	4
22	Lettuce and herbs	(1 pkt.)	3	6
23	Spinach	2	4	6
24	Onions	2	4	3
25	Celery	(1 pkt.)	5	6
26	Corn	16	2	6
27	Corn	16	2	6
28	Corn	16	2	6
1 ounce celery seed should produce 2,000 to 3,000 plants.				
1 ounce tomato seed should produce 1,500 to 2,000 plants.				
1 ounce cabbage or cauliflower seed should produce 1,800 plants.				

Vegetable Varieties Recommended

Asparagus.—Mary Washington.

Beans.—Canning: Round Pod Kidney, Brittle Wax, Refugee. Wax: Pencil Pod Black, Round Pod Kidney, Hodson Long Pod. Green: Princess of Artois (very early), Bountiful, Stringless, Refugee.

Beans (Pole).—Wax: Kentucky Wonder, Golden Cluster. Green: Kentucky Wonder, Asparagus.

Beets.—Detroit Dark Red.

Carrots.—Chantenay, Danvers Half-Long.

Cabbage.—Early: Golden Acre, Copenhagen Market. Midseason: Glory of Enkhuizen, Succession. Late: Danish Ballhead (Short Stem). Savoy: Early Dwarf. Pickling: Danish Stonehead.

Chinese Cabbage.—Wong Bok, Chili. (For best results sow early in July.)

Cauliflower.—Snowball, Dwarf Erfurt.

Celery.—White Plume, Golden Plume or Wonderful, Golden Self-blanching, Winter Queen.

Cucumbers.—Perfection, White Spine, Long Green. Pickling: Snows Pickling.

Citron.—Colorado Preserving.

Corn.—Early: Banting, Pickaninny. Midseason: Golden Sunshine, Golden Bantam. Late: Evergreen Bantam, Country Gentleman.

Lettuce.—Open head: Grand Rapids, Simpson. Cabbage head: New York, Iceberg, All Heart, Crisp as Ice, Boston. Cos: Paris White or Romaine.

Muskmelons.—Honey Dew, Golden Champlain.

Onion.—For field seeding: Early Flat Red, Australian Brown, Globe Danvers, Cranston Excelsior. For transplanting: Cranston Excelsior, Ailsa Craig, Prizetaker, Yellow, White and Red Globe, Red Wethersfield. For pickling: White Barletta.

Peas.—Early: Alaska, Fenland Wonder, World Record. Midseason: Gradus or Prosperity, Thomas Laxton, Laxton Progress, Laxtonian (dwarf), Blue Bantam (dwarf). Late tall: Stratagem (stake), Telephone (stake). Late dwarf: Daisy or Dwarf Telephone.

Parsnip.—Hollow Crown, Guernsey.

Pepper.—Sweet: Harris Earliest. Pickling: Long Red Cayenne.

Parsley.—Champion Moss Curled.

Pumpkin.—Small Sugar, Connecticut Yellow.

Radish.—Scarlet Globe, Saxa, Icicle, French Breakfast.

Squash.—Boston Marrow, Golden and Green Hubbard.

Vegetable Marrow.—Bush and Trailing.

Spinach.—Long-standing Bloomsdale, King of Denmark.

Tomato.—Alacrity, Earliana, Bonny Best, Abel, Chalks Early Jewel.

Turnip.—Early White and Purple Top Milan, Golden Ball, Canadian Gem.

Kohl Rabi.—Early White and Purple Vienna.

Many new varieties listed from year to year are worthy of trial.

Hotbed for Starting Early Plants

The hotbed should be located in a sunny place, preferably on the south side of a building. Fresh horse manure is the most satisfactory heating material. This is left in a pile for five days, when it is forked over evenly, a layer at a time, shaking it out well and tramping it. This is continued until the desired height is reached, usually two feet, and the pile is made three feet wider and longer than the frame. The frame is placed on the manure, and banked on the sides.

The frame is usually made to support 4 sashes, 3 feet by 6 feet in size, or to carry 18 lights of 10- by 12-inch glass. It is usually of two-inch plank, 13 inches high at the back and 8 inches at the front. The sloping end pieces are spiked to these, and three cross pieces of 2-inch by 3-inch lumber are spiked from back to front, level with the top of the plank, to carry the sashes. If flats are to be used two inches of cinders are usually placed over the manure to set the flats on. The sashes are set on, and after a few days a rather violent heating will take place, when the bed should be ventilated to allow the gases to escape. When the temperature of the bed falls to about 80 degrees it can be used for seeding, or for the holding of flats. If flats are not used, soil to the

depth of 4 to 5 inches is used. The hotbed can be used to better advantage with flats and less soil is needed. The flats can be taken inside to be transplanted and may be shifted to coldframes as desired, and their place taken by other plants requiring more heat.

Careful watching during bright days is necessary as the space in the hotbed is small and the temperature may run up quickly and cause injury to the plants. Ample ventilation, by shoving the sashes back a few inches, is necessary. With the bottom heat, a low temperature on top is not a disadvantage, although cold winds blowing on the seedlings may cause injury. During very frosty nights a blanket or old carpet should be placed over the frame. This is rarely necessary, however.

The watering should be carefully done, keeping the soil moist and not wet. Excess moisture and high temperature favour the development of damping-off fungi. It is advisable to water about noon so that the surface of the soil will dry out before night, and the air in the bed contain less moisture. High temperature and moist air may cause considerable loss.

The coldframe is the same as the frame for a hotbed, but is placed on the ground and has no bottom heat. It is advisable after danger from frost is past, to place the plants in a coldframe for a week or ten days to harden up before setting them to the open.

Lettuce

Lettuce will do well on any good garden soil, and requires little attention except shallow hoeing after seeding. For early heads the seeds are started in the hotbed six weeks before planting to the open, the seedlings transplanted to flats about 3 inches apart, and set to the open ground early in May. They are usually set in rows 30 inches apart, and 6 inches apart in the row.

The seed may be sown in the open as soon as the ground can be worked, and the plants from this sowing may be transplanted later to give a succession. The seed may be scattered thinly along the row, and the plants later thinned to 6 inches apart to permit of the development of good heads. Lack of success in growing good lettuce is generally due to not giving the plants sufficient room in the row. Seed sown the last of August, if the soil is moist, will give heads for fall use.

Iceberg is the most popular of the cabbage-head varieties; it should be spaced 8 inches apart. Grand Rapids is a satisfactory open-head sort, and the Cos lettuce is excellent for late use. Crisp as Ice is another sort that should be included; it is of very fine quality, with large, compact heads.

Spinach

This vegetable, so excellent for greens, will very often not grow satisfactorily, usually because of lack of lime in the soil. It requires a rich soil. Seeding may be done early, just as soon as the surface of the ground can be worked, and may be followed by another sowing in three weeks. The plants are thinned 2 to 3 inches apart. On poor soils and in very dry weather the plants go to seed quickly. Seedlings made late in August often give a good fall crop. This is one of the best of the pot herbs and should be grown more extensively. Long-standing Bloomsdale is the best variety; King of Denmark is another good sort.

Peas

Peas may be seeded as soon as the soil can be worked. They are usually sown in rows 30 inches apart and the seed dropped one inch apart in the row and about one inch deep. There are many varieties, ranging from early to late sorts, so that a succession of crops is possible. After a variety is once

established certain plants should be left to ripen so that seed for the next year may be available. If the soil has been prepared in the fall all that is necessary in the spring is to loosen the surface soil and plant the seed. Deep spring cultivation is not needed.

Alaska has been one of the best early-maturing sorts. Fenland Wonder is now taking its place as an early sort of good quality. Gradus and Thomas Laxton are two mid-season sorts of high quality. Stratagem and Telephone are the best late sorts. These latter two, because of heavy vines, are better staked with birch saplings.

Radishes

These may be seeded early and again in late June. The cabbage-root maggot attacks this plant and very often renders it unfit for use. Scarlet Globe, French Breakfast, Saxa, and Icicle are the best varieties.

Carrots and Parsnips

The soil should be prepared deeply, one with a loose, open texture permitting of better root development than does a more compact soil. The seed is sown one-quarter to one-half an inch deep in rows 30 inches apart, which on heavy soils may be ridged slightly. For early carrots seeding early in May is advised, but because of the carrot maggot it is better to delay seeding for the winter-stored crop until the first week in June, as the plants will then in a large measure escape the carrot rust fly which causes the maggot. From this late seeding good roots will be produced for storage. For early plantings several applications of corrosive sublimate, one ounce to 10 gallons of water, poured along the row over the plants is advised as being effective. The young plants are thinned to only 3 inches apart in order to avoid excessive growth, as a very large carrot is not liked for table purposes. To get good quality an even growth throughout the growing season is desirable, and a soil having ample moisture will give the best texture and quality. The soil should not be drawn away from the plant, exposing the crown of the root to the sun. Hilling up to cover all parts of the root is very often advisable. A carrot with the top green is as objectionable for domestic use as is a sunburned potato. Unless this precaution is taken many otherwise good carrots are unmarketable, or at best are not a desirable grade for market. The varieties Chantenay and Danvers are the ones usually grown.

The Hollow Crown parsnip is generally used, and is one of the most satisfactory. The seed is planted in the same way as carrot seed, and the plants thinned to 4 inches apart. Usually 4 pounds of seed per acre is used.

Beets

These can do with shallower cultivation than carrots and parsnips. For early use they are seeded as soon as the ground can be worked. They are thinned 3 to 4 inches apart. For winter beets it is better to delay planting until early June, thus avoiding the large beet so undesirable for home or market. With continuous growth a beet of good quality will result on any soil. The fibre often noticed is due to some check in the development of the root, usually caused by dry weather. Detroit Dark Red is the best variety so far offered.

Garden Turnips

These may be seeded early, and on almost any soil will develop a root of excellent quality early in the season. Golden Ball is one of the best varieties.

Onions

GROWN OUTSIDE.—The onion plant requires an early start on a soil having plenty of available plant food. The growth should be rapid during June, July and early August so that the plant will be forced into maturity during the latter part of August or early September, before the approach of excessive fall rains. Delayed growth results in late maturity, and very often a continuous growth, which prevents ripening and causes the thick-necked, immature bulbs so often noticed.

Any good garden soil will grow satisfactory onions of Extra Early Flat Red and Yellow Globe Danvers from seed sown as early in the spring as the soil can be worked. It is better to prepare the soil by manuring the previous fall, as this permits it to settle and become firm. Spring cultivation should be shallow, working to a depth of three inches to form a good seed-bed. If manured, ploughed and prepared in the spring, rolling will compact the soil and further shallow surface working for a seed-bed may be necessary. The soil is left level for seeding.

In addition to stable manure at the rate of 15 to 20 tons per acre, 3 ounces per square yard of a 5-10-5 fertilizer is scattered broadcast and well worked into the soil.

The seed is planted in rows, usually a foot apart. This makes it necessary to do all cultivation, which is shallow, with a hand wheel-cultivator and hoe. After some experience the seed sower may be adjusted so that little thinning will be necessary. The crowding of the plants tends to force maturity, and if very thick to give too large a proportion of small bulbs. For good size the plants should be spaced two to three inches apart. The seeder is set to sow about one-eighth of an inch below the surface. Three pounds of seed is generally used per acre.

FROM PLANTS STARTED UNDER GLASS.—Because of the short growing season in the Maritime Provinces and the generally unfavourable weather during the fall for the maturing and curing of onions it is often advisable to grow the plants under glass for at least two months in the spring. Planting is usually done during the first week in May. The larger the plants grow and the stockier they are at transplanting time the better. Early seeding, and not forcing the plants too much, is better than forcing them rapidly at a high temperature. Some growers prefer to give three months under glass and leave the plants in a coldframe during the last ten days of April, thus securing well-hardened plants for setting. Plants taken direct from the hotbed to the open do not do so well as those hardened to outside conditions in a frame without any bottom heat. Plants may be started from the middle of February to the middle of March, but the slower growth under fairly cool conditions is preferable.

Shallow flats, usually 12 by 22 inches and 3 inches deep, are preferred. A good garden soil with considerable available plant food, as indicated by a high humus content, is advised. Some fine bonemeal may be used, but it is generally not advisable to use commercial fertilizer unless it is done very sparingly, as injury to the young seedlings may result if it is used in quantity.

The soil is screened and the coarse part used in the bottom of the flat, with the screened part on top. It is put in evenly and pressed at the edges and over the surface with the fingers, to get it even throughout. The surface is levelled off so that when settled it is about one-half an inch from the top of the flat. The seed is usually scattered broadcast, about fifteen to the square inch. The seed is covered one-eighth of an inch deep, and the surface is very slightly pressed down. The soil is kept damp by watering as needed. It requires considerable judgment in watering to see that the soil to the depth of the flat is damp but not too wet. Light watering in the morning to keep the ground moist is necessary. A temperature of 60 degrees is advised.

The seeds may be started in a kitchen window until well germinated, but under such conditions unless they get full day sun the plants will be drawn and weak in growth. A glass house or hotbed is necessary to grow good plants after they have had two or three weeks in a flat in the window of a dwelling house.

Planting to the open is done by taking the plants to the field in flats, lifting out the plants in bunches, and shaking the earth from the roots. The lower part of the root is usually cut off for convenience in transplanting. Shallow drills about one inch in depth are made with a marker. The plants are dropped four inches apart, and then covered by pressing the soil firmly around the roots, with the bulb of the plant slightly below the surface. The rows are spaced one foot apart. If large onions are wanted spacing the plants up to one foot apart will give large and well-matured bulbs. Shallow surface cultivation should be practised.



Extra Early Flat Red onion seed growing at Kentville, Nova Scotia. This is a desirable variety for sowing direct to the ground. Any one can carry bulbs over the winter and grow their own seed.

The plants should be matured about the middle of September, when they are pulled, throwing three rows into one. These are allowed to remain outside for about two weeks, when they are put into crates and placed in a shed to be later topped as time permits.

Cranston Excelsior is one of the best yellow varieties. Prizetaker, Red Globe and White Globe are leading yellow-, red- and white-skinned sorts for transplanting.

Cabbage

There is probably no vegetable used in larger volume than the cabbage. It has been probably the first in quantity of all vegetables grown, and its importance still continues. Large early-developed leaves and an active root serve to build up a compact central head. Well balanced food supply and moisture are essential, as the cabbage is a gross feeder and the transpiration from the foliage is great. Any root injury from cultivation should be avoided.

Shallow cultivation, not more than 2 inches deep after the plants are established, is important. Injury from root maggot will result in poor and unprofitable heads.

Many soils are deficient in vegetable matter, and, as vegetable matter aids in a uniform moisture supply, an application of 15 to 20 tons of manure to the acre is necessary. The heavier soils are usually selected for the late crops of cabbage, while the light soils will give earlier heads if properly fertilized, because of the earlier planting possible. When manure is used as stated above 500 pounds of superphosphate should also be supplied. If 10 tons of manure is used the additional fertilizer likely to give the best results is 800 pounds of 5-10-5 per acre. When no manure is applied 1,200 to 1,800 pounds of 5-10-5 is the fertilizer generally used. The usual practice is to sow the fertilizer broadcast and harrow it in before planting. It is found now that there is an advantage in placing the fertilizer in a band 4 inches at each side of the plant and covered about 1½ inches deep.

Cabbage should not be grown on the same land more than once in four years, if clubroot is to be avoided. The liming of the soil is necessary in order to lessen this danger and give proper soil conditions.

For an early crop the cabbage plants are started under glass about the middle of March. The seedlings are transplanted two weeks later, usually into flats, spacing them 2 inches apart. A week before planting out, which is done the first week in May, the flats are placed in a cold frame to harden the plants off. For late cabbage the seed is sown thinly in the open ground the first week in May and the plants set to the growing area early in June. The spacing is 2 feet apart in the row with the rows 2½ feet apart. Planting closer than 2 feet in the row is not advised, particularly on soils likely to be low in moisture.

Golden Acre and Copenhagen Market are the two varieties most grown for early market, Glory of Enkhuizen for mid-season, and Danish Ballhead for late. These are all round-headed firm sorts which seem to suit the market best. Succession and Flat Dutch are of the drumhead type, and are grown extensively. Danish Stonehead is used extensively for spice pickling.

A temperature as near to 32 degrees as possible gives the best storage. A good circulation of air around the head is necessary and for this reason the heads are often placed on slatted shelves or hung overhead by the roots. The usual commercial storage is to tier the heads between foot passageways. The plants are harvested with the roots on and stored with the heads next to the passage, and if care is given may be built up to a depth of 6 or 8 feet.

Cauliflower

Cauliflower may be handled the same way as cabbage. It is, if anything, more exacting of space if the best heads are to be obtained, and is very much more sensitive than the cabbage to root or stem injury. It requires an even water supply during its entire growth. Snowball and Dwarf Erfurt are the favourite varieties.

Celery

Celery should be more generally grown. It is not difficult to grow if close attention is given to some details. It takes about two weeks for the seed to germinate. The important thing is to keep the soil damp and the air temperature between 50 and 60 degrees. Two weeks after germination the plants are singled out, spacing them 1½ inches apart. For starting plants for early planting shallow boxes or flats of a size easily handled will be found to be the best. Seed sown the middle of March will give good plants for setting to the open about the middle of May. For later plantings seed started in early April will be ready for setting early in June. For this, if the seeding is thin, the plants

may be set direct to the field without a previous transplanting. If early seeding can be made in the open the last of April good plants can be secured for planting June 10.

The celery plant requires a good soil with plenty of moisture so that it may make uninterrupted growth. Pithy or hollow stalks are often encountered, and these seem to be due primarily to an over-supply of nitrogen in proportion to the phosphoric acid and potash. Manures used for celery are very often deficient in both these elements. It is considered by experimenters that the proper fertilizer balance is 4-8-13. This is also advised and sold extensively as a potato fertilizer. It is advisable in growing celery to use 2 or 3 ounces of this fertilizer per square yard, well worked into the soil, in addition to any manure used.

Well-rotted manure 4 inches deep is thrown into a trench made by ploughing out two furrows. The soil is thrown back over the manure, and the whole mixed by again ploughing or by digging. The fertilizer is then applied and the ground disked or cultivated. The reason for this preparation is to get good moisture and plant food conditions.

The plants are set 6 inches apart in rows $3\frac{1}{2}$ feet apart. Planting in double rows 4 feet apart, setting the single rows 6 inches apart, and alternating the plants 8 inches apart in the rows, is usually entirely satisfactory but makes more hand labour in hilling up for blanching if earth is used. It is not necessary to plant in trenches, but planting slightly below the soil level is advised if watering in the early season is necessary.

Blanching may be done by using earth dug out from between the rows when the plants are 8 to 10 inches tall. Suckering growth is removed and the stalks are gathered together with the hand so that the soil will not get into the centre of the plant. As the plants develop more hilling up will be necessary. Boards 10 to 12 inches wide, set on edge close to the plants and supported by stakes, may be used. The aim is to shut out the light, and any means to do this may be adopted.

For storage, lift the plants with the roots intact and holding as much earth as possible, and set them on an earth floor close together. Pack with sand leaving every fourth row out for ventilation and soil watering should this be necessary. Water should not touch the foliage. Good ventilation should be given and the temperature kept as near to 32 degrees as possible.

White Plume and Golden Self-blanching are two of the best varieties.

Salsify or Vegetable Oyster

Salsify requires a loose, rich soil and should be planted early and thinned to 3 inches apart. This is an excellent vegetable, but is very little used.

Parsley

A few plants of parsley should be in every garden. Early seeding in the open ground, and thinning to six inches apart in the row, will allow of the development of excellent plants. Champion Moss Curled is one of the best varieties. A few of the best plants may be potted up in the fall, and will grow satisfactorily indoors through the winter. It is one of the most acceptable of all the plants used for garnishing.

Cress

This is one of the condiments of special interest. The upland cress, which is the kind usually grown in the garden, somewhat resembles the water-cress.

For those having a slow-running brook or water ditch, water-cress should be introduced. It can be started from seed, or better from branches with roots attached planted in the side of the course. The salad from this is excellent, and the plant is decidedly attractive as a garnish.

Sweet Herbs

No garden is complete without sage, summer savory, and sweet marjoram. Any good garden soil will grow these herbs. The seed is sown in the early spring and the plants thinned to 6 inches apart. Summer savory and sweet marjoram are cut when nearly in full bloom. Sage and thyme are gathered early in the fall before heavy fall rains, which are likely to scatter seed over the leaves.

Mint may be grown in the garden if frequently watered. Or, if there is a running brook it is better to plant the mint along the edge. It is propagated by branches with roots on, planted in the early spring about 4 inches deep. The spearmint, *Mentha spicata*, is largely used in cultivation for mint oil, while the peppermint, *Mentha piperita*, is the common garden mint.

Beans

Beans, unlike peas, should not be planted until the ground warms up, usually the latter part of May or early in June. They do best on a light soil, but will grow well in any good garden soil. They are planted in rows 2½ feet apart and the seed dropped two to three inches apart in the row and one-half inch deep. Some prefer to plant in hills 18 inches apart in the row, planting 8 to 10 seeds, evenly spaced 2 inches apart, in a hill, and think they get better results. The pole beans are usually placed in hills 2 feet apart and 5 plants left to a hill, and a stake set in the centre of the hill for their support. There are a number of varieties, so that a succession of crops is available. After planting shallow cultivation is all that is required, and care should be taken not to work among the plants while the foliage is damp. This seems to spread disease should it be present.

The following varieties are recommended: Princess of Artois, the earliest, is a green-pod. Round Pod Kidney Wax is early and one of the best, but susceptible to pod rusts. Hodson Wax is almost immune to pod diseases but it is not so high in quality as some others, and unless picked early may develop fibrous strings which are objectionable. Stringless Green Pod is a good sort. Refugee or 1,000 to 1 should be included in all plantings for late use. Pole beans should be included, the best being Kentucky Wonder Wax. For a broad bean the Windsor is one of the best. A black aphid usually attacks the broad bean, and may be controlled by sprinkling soapy water over the plants.

Tomatoes

Tomatoes are a warm-season crop. They will not stand frost, and planting before the ground is warm, about the first week in June, will not materially advance the crop. The lighter types of soil, and sunny locations, are best for the reason that such lands have higher soil temperatures. On very warm soils late May planting may be advantageous. The rapidity of growth is influenced by soil temperature during June, and because the normal temperature for best growth is rarely reached in Nova Scotia in that month, the tomato requires nearly ten days longer to come into fruit than it does in more inland regions where the June temperature is higher. In any case, 65 to 70 days are necessary after planting before ripe fruit can be harvested, even with the earliest variety.

Early working of the soil is a great aid in warming it up because it prevents surface evaporation, which takes up heat that should go toward warming the

soil. The reason why cultivation warms a soil is that it checks the flow of subsoil water to the surface, just as cutting the wick of a lamp and placing the two ends together as closely as possible will check the upward flow of oil through the wick. The fact that the water reaching the surface is lessened allows the heat to penetrate the soil particles before being used up by the surface moisture.

When a tomato plant is set to the open ground the roots are severed and for some time are not able to function. During this time the plant will wilt because it is not able to take up the water through the broken roots to make up the loss from transpiration from the foliage. This loss is greater under sunlight with a brisk wind blowing, and has brought about the practice of shading to prevent loss and to modify wind velocity. This seems to be desirable, but the repeated watering so often practised checks root activity, and because of cooling and shading the soil may be a disadvantage. The average soil in early June, after one watering to settle it around the plant, should not be watered again. Further watering if persisted in will check the vigour of the plant, and yellowing, unhealthy plants will result.

It is necessary in cutting the plants from the flats in which they are growing to leave a square of soil as little disturbed as possible, and under such a practice even one watering may not be necessary. The best spacing for plants is 4 by 4 inches in the flats, with a depth of 3 inches of soil. They should be cut out with a sharp knife so that as many of the roots as possible will be undisturbed. The plants set should be 8 weeks old and well hardened to the outside temperature.

There are really only two varieties of tomatoes suitable for Nova Scotia, Earliana and Bonny Best. The former is about one week earlier than the latter, but the latter is better for canning and marketing, though it will not give the crop of ripened fruit that Earliana will. There are many strains of these two varieties, and if a good strain is obtained the seed should be kept from year to year.

The soil for tomatoes should not be rich. Rich soil induces too much vine growth. Manure, 10 tons, and 500 pounds of a 4-16-4 fertilizer, per acre, will give the best yields of ripe fruit. If manure is not used, apply 600 to 800 pounds of a 4-16-4 fertilizer per acre. A special application of nitrate of soda, one-tenth of an ounce per plant, evenly scattered on the square foot of soil surface immediately around the plant, and applied a week after planting, will aid materially in getting the plant away to a vigorous start. High nitrogen applications are not best for good fruit production, and many tomato plants are killed by using too much fertilizer around the plants during early growth. Lack of fruit is often due to too much nitrogen.

The plants are set 4 by 4 feet apart in the field, and shallow cultivation to keep down weed growth is practised.

Corn

Garden corn is not grown as much as it should be. One of the reasons why it is so often unsatisfactory is that it is seeded too thickly. It should be grown in hills 3 by 3 feet apart, having five plants to a hill, or in rows 3 feet apart and the plants not closer than six inches.

Preparation of the soil should be reasonably deep and thorough, using stable manure and adding 500 pounds per acre of a 5-10-8 or similar high-grade fertilizer. This may be scattered along the edge of the row as soon as the plants are well established, and worked in with a hoe. The fertilizer will encourage a quick growth. Frequent shallow cultivation is important, and some hoeing is necessary.

The seed should be sown one inch deep as soon as the soil gets warm, and a good practice is to plough and work the land ten days before planting, as this will give a higher soil temperature. The seed is usually sown about May 20 after another shallow working, and further tillage will not be necessary until the plants are four inches high.

Banting, a yellow corn with rather small ears, is dwarf in growth but the earliest of all varieties grown. Golden Sunshine is earlier than Golden Bantam. There are several strains of Golden Bantam and some are much earlier than others. Evergreen Bantam follows Golden Bantam, and this in turn is followed by Country Gentleman. The trend is towards a yellow table corn. All the above-mentioned varieties are of excellent quality.

Vine Crops

In this group are cucumber, squash, pumpkin and melon, and their cultivation is very similar. They require a rich, warm soil. If the land is heavy, cultivating it as soon as it is fit and allowing it to warm up will help greatly in overcoming this condition. Spring ploughing of such areas is generally advisable, as this cuts off some of the flow of soil water to the surface, and the heat that would otherwise be lost by evaporating the surface moisture will warm up the soil. For heat-loving crops there is nothing that is so important as spring ploughing, and working the land down as soon as it is dry enough, so that it will become friable under the disk. This should be done early and the land then left until planting is possible. All heat-loving plants will benefit by this practice. The opening up of a trench for the manure by throwing out four good furrows will aid materially, for the reason that the surface six inches of soil covering the manure is cut off from the capillary flow of water from below, and the heat from the manure and the heating of the surface soil will permit of rapid germination under a more favourable temperature. The only difficulty is that seasonable rains may not wet this soil over the manure enough to promote germination, and watering may be necessary, but this rarely happens. The seed should be planted deep enough to be in moist soil, and if this is done little trouble will be experienced. In the plan proposed the centre of the vegetable garden is to be in vine crops continued from year to year. For these crops abundant humus and plenty of plant food are required, and the continuous cropping of the same area will insure this.

The manure is tramped into the trench and covered with six inches of soil. This area may at the start be a little above the ground level but it will settle as the manure decays. The roots of vine crops extend as far as or farther than the vines go, and the general manuring of the whole area is essential. The main object in placing manure under the seedlings is to supply conditions for early, rapid growth, and the surplus manure will give the seedlings a good start. Shallow cultivation is advised.

The space devoted to these crops should be 6 to 10 feet wide. The space between the different vine crops should be 6 feet. The seed should be planted in rows in early June and thinned so that the plants are not less than 6 inches apart in the rows, or the plants may be placed in hills, spacing the melon and cucumber hills 3 feet apart and leaving 5 plants to a hill, and the squash and pumpkin hills 6 feet apart, with 3 plants to a hill.

Perfection and White Spine are good cucumbers. Golden Hubbard and Green Hubbard are good varieties of squash. The English vegetable marrow may be included, as it is a delightful vegetable if properly cooked. Small Sugar is probably the best pumpkin in quality. If large pumpkins are desired Connecticut Field is one of the best.

The Citron melon may be grown in this way and also the early-ripening watermelons and muskmelons. The latter are not usually satisfactory unless started under glass and grown for a period in the field under glass. The season is too cool for satisfactory growth.

Asparagus

There is no more delicious spring vegetable than asparagus. The culture of this vegetable is easy. It takes two years to get a bed started and probably for this reason few have patience to bother with it. The plants for permanent planting are started from seed sown in the ground early in the spring. One-half ounce will give all the plants required and there will be plants left to give to others. The seed is put in about one inch deep, and it is often a good plan to sow a few radishes also, to mark the row. Sow the seed thinly about two inches apart, as better plants will result for setting the next spring. Remove the radishes when the young asparagus plants appear and keep the ground free from weeds.

The asparagus bed should be well enriched. It is not possible to make it too fertile, and it is well to prepare the bed the year before by digging into the soil manure or waste material of any kind that will rot. See that all weeds and grass are kept down so that when the permanent planting is made there will not be grass or weeds to check the development of the plants. One should plan on 100 plants. The plants are set in rows 5 feet apart and 18 inches apart in the row. If the land is heavy mound up the rows, leaving a hollow between them for good drainage. If the land is naturally well drained this is not necessary. Deep working, digging 4 inches deep, is advised, and this may be repeated several times the first year. If the land is ready to receive the plants, one- or two-year-old plants may be set early in spring. These plants are obtainable from any seed merchant. It is well to order early so that early planting may be done, as the plants should be set as soon as the ground can be worked, usually the first week in May. The variety Mary Washington should be obtained, as it is undoubtedly the best.

The crown of the plant is set about eight inches below the soil level. In garden work a hole is dug about 10 inches deep and 12 inches in diameter. The soil below the surface for about 5 inches may be used for covering the plant. The other five inches is thrown out and is not to be used. The plant is placed with the roots spread out in all directions on the solid surface of the bottom of the hole, and covered with the surface soil. The hole is not filled at this time but as the plants grow may be gradually covered in until level. Some place only three inches of soil over the plant when first set. Use only plants with good well-developed roots, one in each place. The bed should be kept free from weeds, particularly grass, at all times. The second year after planting cutting may be done, but care should be exercised not to cut the bed too close as it is necessary that enough good stalks be left to allow the plant to make a good summer growth.

It has been stated already that asparagus requires plenty of available plant food. This may be supplied by using well-rotted manure or an application of one-quarter to one-half pound of a high-grade commercial fertilizer per square yard, applied immediately after the season of cutting is past, usually early in July. This is well worked into the soil by hoeing or digging the surface. A good supply of lime worked into the soil is highly desirable. Even if manure is used a quick-acting fertilizer with plant food readily available is important. Manure is slow in action and must decay before the plant food is available.

Rhubarb

Rhubarb thrives best in a deep, rich, mellow soil. A clay soil or one with a hardpan subsoil should be avoided. The ground should be heavily manured, and worked deeply. It is impossible to overfeed this plant. The tendency to produce seed stalks will be greatly lessened by fertilizing heavily. The plantation may be started from seedling plants one or two years old, or

from division of the crown. In dividing the crown each piece should have at least one good strong eye. The planting is done in the spring, and the plant set so that the top of the bud or eye is level with the soil.

Old plantations may be improved by ploughing off the side of the old plants, manuring heavily, and cultivating thoroughly, or the plants may be lifted, divided, and reset into fresh soil. A plantation properly handled and thoroughly manured should give good results for ten years.

The early spring growth depends largely upon the leaf growth made the previous season, hence the importance of not removing too much foliage at once, and of encouraging good strong foliage during the summer and fall, for the purpose of storing in the root nourishment for the next spring's growth. The importance of cultivation during the summer, keeping the soil well worked and all weed growth down, is therefore obvious.

The usual practice is to manure in the fall and work this in the following spring. Some follow the practice of manuring heavily, which prevents the frost from penetrating the ground, and then remove the bulk of this in the early spring; others allow this heavy mulch to remain around the plant during summer, do not cultivate, but pull out any weeds that may start.

Horse-Radish

The horse-radish, to do best, requires a deep, moist, cool loam. For long, straight roots the soil should be dug deeply and the fertilizer well worked into it, to encourage deep feeding; otherwise, if surface fed only, plants with many short roots are likely to develop.

The horse-radish is propagated by taking small side-roots from the previous season's growth, not less than one-quarter inch in diameter and 4 to 5 inches long. When taking these it is well to cut the top end square and the bottom slanting, to serve as a guide in planting the top end up. The cuttings are planted upright or slightly sloping, about one foot apart in rows $2\frac{1}{2}$ feet apart, with the top about 3 inches below the surface. The ground may be worked as advocated for root crops.

This plant will stand the winter outside, and the roots for propagating from may be dug in the early spring at planting time. Or the cuttings may be made in the fall, when digging the roots for storage, and tied in bundles with the marketable roots in a cool damp cellar.

It is best to remove the old plants every year and dig out all roots, otherwise the plant will spread and become troublesome, and the roots will not be suitable for market.

A FARMER'S ACCOUNT BOOK

Farming is a business, and if it doesn't pay the farmer wants to know why. Some record of receipts and expenses together with an inventory (a list with values of live stock, feed, implements, etc., on hand), taken at the beginning and end of the farmer's year, must be kept if he is to find out why or where it doesn't pay. A record of each department of the farm business should be kept. This is the only way to find the profit or loss from each department.

To assist the farmer in keeping a record of receipts and expenses the Dominion Department of Agriculture has issued a very simple and useful account book. To keep accounts in this book requires no special knowledge of accounting, simply the ability to write and add, and a record of transactions can often be made in less than one hour a week. This account book, while simple, is a great step in advance of keeping no accounts whatever.

"The Farmer's Account Book" may be procured from the KING'S PRINTER, OTTAWA, for the small sum of ten cents. Now is a good time to take an inventory and start keeping accounts.

